

IN THE SPECIFICATION:

Please amend the specification as follows:

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A transmitter for a portable radio communication apparatus comprising:

a modulator ~~having~~ including a first port for inputting a baseband signal, ~~and a~~ second port for inputting a local oscillator signal, ~~and including~~ means for rectifying the input local oscillator signal to provide a conductance waveform at a multiple of the local oscillator signal, ~~and~~ means for mixing the baseband signal with the conductance waveform at said multiple of the local oscillator signal frequency for up-converting the baseband signal to a radio frequency modulated carrier; and

~~the transmitter including~~ means for controlling the gain of the modulator thereby' to control the output level of the modulator.

2. (Currently Amended) A transmitter according to claim 1, wherein:
_____ a local oscillator signal drives the modulator at a multiple of its frequency.

3. (Currently Amended) A transmitter according to claim 1, wherein:
the means for controlling the gain of the modulator comprises current control means.

4. (Currently Amended) A transmitter according to claim 1, wherein:
the modulator comprises two cross-coupled pairs of switching elements,
wherein a signal input modulates the switching elements at a multiple of the local
oscillator frequency.

5. (Currently Amended) A transmitter according to claim 4, wherein:
said two cross-coupled pairs of switching elements comprise two cross
connected long tail pairs of bipolar transistors.

6. (Currently Amended) A sub-harmonic mixer, comprising:
_____ switching means;
_____ a first port for inputting of a baseband signal to the switching means to be up-
converted; and
_____ a second port for inputting a local oscillator signal to drive the switching
means at an even multiple of the local oscillator frequency for upconverting the
baseband signal to transmission frequency.

7. (Currently Amended) A transmitter of a portable radio communication
apparatus comprising:
a modulator including a switching circuit, a first port for input of a baseband
signal and a second port for input of a local oscillator signal to the switching circuit
which provides a conductance waveform at a frequency multiple of an oscillation

frequency of the local oscillator signal, and a mixer which mixes the baseband signal with the conductance waveform at the frequency multiple of the local oscillator signal frequency for up-converting the baseband signal to a radio frequency modulated carrier; and

_____ a gain control, coupled to the modulator, which controls the gain of the modulator to control the output level of the modulator.

8. (Previously Presented) A transmitter according to claim 7, wherein:
the local oscillator signal drives the switching circuit at a multiple of a frequency of the local oscillator.

9. (Previously Presented) A transmitter according to claim 7, wherein:
the gain control comprises a current control.

10. (Previously Presented) A transmitter according to claim 7, wherein the switching circuit of the modulator comprises:

two cross-coupled pairs of switching elements, wherein the local oscillator signal modulates the switching elements at the frequency multiple of the local oscillator frequency.

11. (Previously Presented) A transmitter according to claim 10, wherein:
the two cross-coupled pairs of switching elements comprise two cross connected long tail pairs of bipolar transistors.

12. (Currently Amended) A sub-harmonic mixer, comprising:
a switching circuit; and
a first port for input of a baseband signal to the switching circuit to be up-converted; and
_____ a second port for input of a local oscillator signal which drives the switching circuit at an even multiple of the local oscillator frequency for up-converting the baseband signal to a transmission frequency.